

Notice of Allowability

Application No.

10/726,446

Examiner

SOPHIA VLAHOS

Applicant(s)

SMITH ET AL.

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2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 8/21/2007.
2. ☒ The allowed claim(s) is/are 1,3,5,7,10,11,13,15,17 and 20-44.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION

Specification

1. The amendment to the specification (paragraph [0038]) received on 8/21/2007 is accepted.

Allowable Subject Matter

2. The following is an examiner's statement of reasons for allowance:

The prior art of the record fails to teach or suggest alone or in combination:

A method, comprising: modulating a signal in a first domain, modulating the signal in a second domain, modulating the signal in a third domain, wherein modulating the signal in the first domain, modulating the signal in the second domain, and modulating the signal in the third domain defines a three dimensional orthogonal symbol constellation selected from the group consisting of face-centered cubic spheres and hexagonal close-packed spheres, each sphere having 12 nearest neighbors, and wherein the three dimensional orthogonal symbol constellation includes an origin at {0,0,0} containing a center sphere characterized by zero power transmitted as recited in method claim 1 and in combination with other steps of the claim.

Claims 1, 3, 10, 21, 24, 27 are allowed.

The prior art of the record fails to teach or suggest alone or in combination: A method, comprising: modulating a signal in a first domain, modulating the signal in a

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second domain, modulating the signal in a third domain, modulating the signal in a fourth domain, wherein modulating the signal in the first domain, modulating the signal in the second domain, modulating the signal in the third domain, and modulating the signal in the fourth domain defines a four-dimensional orthogonal symbol constellation of face-centered cubic hyperspheres, each hypersphere having 24 nearest neighbors, and wherein the four-dimensional orthogonal symbol constellation includes an origin containing a center sphere characterized by zero power transmitted, as recited in method claim 5, and in combination with other steps of the claim.

Claims 5, 22, 25, 28, 39, 43 are allowed.

The prior art of the record fails to teach or suggest alone or in combination:
A method comprising: modulating a signal in a first domain, modulating the signal in a second domain, modulating the signal in a third domain, modulating the signal in a fourth domain, modulating the signal in a fifth domain, wherein modulating the signal in the first domain, modulating the signal in the second domain, modulating the signal in the third domain, modulating the signal in the fourth domain, and modulating the signal in the fifth domain defines a five-dimensional orthogonal symbol constellation of hyperspheres, each hypersphere having 48 nearest neighbors, and wherein the five-dimensional orthogonal symbol constellation includes an origin containing a center sphere characterized by zero power transmitted, as recited in method claim 7 and in combination with other steps of the claim.

Claims 7, 23, 26, 19, 40 are allowed.

The prior art of the record fails to teach or suggest alone or in combination: A method, comprising: receiving a signal, demodulating the signal in a first domain, demodulating the signal in a second domain, demodulating the signal in a third domain, wherein demodulating the signal in the first domain, demodulating the signal in the second domain, and demodulating the signal in the third domain decodes a three dimensional orthogonal symbol constellation selected from the group consisting of face-centered cubic spheres and hexagonal close-packed spheres, each sphere having 12 nearest neighbors, and wherein the three dimensional orthogonal symbol constellation includes an origin at $\{0,0,0\}$ containing a center sphere used for counting purposes but not for energy determination, as recited in method claim 11 and in combination with other steps of the claim.

Claims 11, 13, 20, 30, 33, 36 are allowed.

The prior art of the record fails to teach or suggest alone or in combination: A method, comprising: receiving a signal, demodulating the signal in a first domain, demodulating the signal in a second domain, demodulating the signal in a third domain, demodulating the signal in a fourth domain, wherein demodulating the signal in the first domain, demodulating the signal in the second domain, demodulating the signal in the

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third domain and demodulating the signal in a fourth domain decodes a four-dimensional orthogonal symbol constellation of face-centered cubic hyperspheres, each hypersphere having 24 nearest neighbors, and wherein the four-dimensional orthogonal symbol constellation includes an origin containing a center sphere used for counting purposes but not for energy determination, as recited in method claim 15 and in combination with other steps of the claim.

Claims 15, 31, 34, 37, 41, 44 are allowed.

The prior art of the record fails to teach or suggest alone or in combination: A method, comprising: receiving a signal, demodulating the signal in a first domain, demodulating the signal in a second domain, demodulating the signal in a third domain, demodulating the signal in a fourth domain, demodulating the signal in a fifth domain, wherein demodulating the signal in the first domain, demodulating the signal in the second domain, demodulating the signal in the third domain, demodulating the signal in a fourth domain, demodulating the signal in the fifth domain decodes a five-dimensional orthogonal symbol constellation of hyperspheres, each hypersphere having 48 nearest neighbors, and wherein the five-dimensional orthogonal symbol constellation includes an origin containing a center sphere used for counting purposes but not for energy determination, as recited in method claim 15 and in combination with other steps of the claim.

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Claims 15, 31, 34, 37, 41, 44 are allowed.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shattil (U.S. 6,686,879)

Terry et. al., (U.S. 69,614,861)

Sousa et. al., (U.S. 5,832,044)

Walti (U.S. 4,084,137)

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is 571 272 5507. The examiner can normally be reached on MTWRF 8:30-17:00.

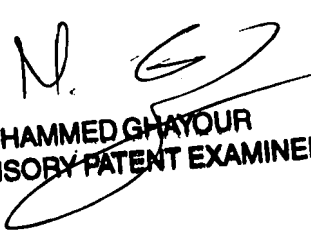
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SV
9/18/2007


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER